

## DETAILED ACTION

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Dov Rosenfeld on 11/5/2008.

The application has been amended as follows:

Claim 57 end of line 14 "." has been changed to --;--.

Claim 57 end of line 16 "." has been changed to --;--.

Claim 58 end of line 11 "." has been changed to --;--.

Claim 23 has been amended as follows:

23. (Currently amended) A method as recited in claim 11, wherein the wireless networking standard is ~~one of the~~ an IEEE 801.14 802.11 OFDM standards standard according to which the first part of the preamble includes a periodic series of short symbols and the second part includes long symbols and a guard interval.

Claim 35 has been amended as follows:

35. (Currently amended) An apparatus as recited in claim 33, wherein the wireless networking standard is ~~one of the~~ an IEEE 801.14 802.11 OFDM standards

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standard according to which the first part of the preamble includes a periodic series of short symbols and the second part includes long symbols and a guard interval.

Claim 43 has been amended as follows:

43. (Currently amended) An apparatus as recited in claim 42, wherein the wireless networking standard is ~~one of the~~ an IEEE 801.11 802.11 OFDM standards standard according to which the first part of the preamble includes a periodic series of short symbols and the second part includes long symbols and a guard interval.

Claim 59 has been amended as follows:

59. (Currently amended) A method as recited in claim 58, wherein the wireless networking standard is ~~one of the~~ an IEEE 801.11 802.11 OFDM standards standard according to which the first part of the preamble includes a periodic series of short symbols and the second part includes long symbols and a guard interval.

***Allowable Subject Matter***

1. Claims 3-5, 8-27, 33-39, 42-43, 53-55 and 57-59 are allowed.

***Reason for Allowance***

2. The following is an examiner's statement of reasons for allowance:

The prior art of record does not teach the following:

In regards to claim 3 the prior art does not teach set of SOP methods comprising:  
detecting that a threshold was exceeded by a measure of the average received signal

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power; detecting that a threshold was exceeded by a measure of the average power rise of the received signal; and detecting that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble, and detecting a rise in a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble.

In regards to claim 8 the prior art does not teach set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal; that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble; and that a threshold was exceeded by a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble, and determining the OR of the plurality of the corresponding logical indicators wherein the measure of the correlation quality is a comparison measure of the instantaneous correlation power with the average correlation power in the recent past.

In regards to claim 10 the prior art does not teach determining at least two of the set of metrics that comprises: a measure of the carrier to noise ratio (CNR); a measure of the received signal power; a measure of the autocorrelation of the input signal at the period of the symbols; a measure the correlation of the input signal with at least one of the short symbols; and a measure of the correlation of the input signal with the start of the second part of the preamble, wherein determining the initial timing uses at least two

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indicators of the set of indicators that includes: whether or not a measure of the carrier to noise ratio (CNR) is within a CNR range; that a threshold was exceeded by a measure of the change of the averaged received signal power; that a range was reached by a measure of the autocorrelation of the input signal at the period of the symbols; that a threshold was exceeded by a measure of the correlation of the input signal with at least one of the short symbols; and that a change was detected in a measure of the correlation of the input signal with the start of the first part of the preamble, and that a threshold was exceeded by a measure of the correlation of the input signal with the start of the second part of the preamble, and wherein determining the initial timing determines the timing from at least one of: the time a measure of the rise in the received signal power peaks; the time a measure of the autocorrelation of the input signal at the period of the symbols changes to indicate the time of end of the series of periodic symbols; the time a measure the correlation of the input signal with at least one of the short symbols peaks to indicate an SOP time; and the time a measure the correlation of the input signal with at least one of the short symbols changes to indicate the time of end of the series of periodic symbols; and the time a measure of the correlation of the input signal with the start of the second part of the preamble peaks to indicate the time of the start of the second part.

In regards to claim 27 the prior art does not teach detecting whether or not a measure of the CNR is in a CNR range wherein it is expected that a change of a measure of the autocorrelation of the input signal at the period of the symbols is

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effective to indicate the time of end of the series of periodic symbols; and determining an initial timing for a packet using that a threshold was exceeded by a measure of the correlation of the input signal with the start of the second part of the preamble, further using the time of a peak in the correlation of the input signal with the start of the second part of the preamble, and, if it is detected that the measure of the CNR is in the CNR range, further using that a range was reached by the autocorrelation measure.

In regards to claim 33 the prior art does not teach the initial timing determining circuit determines the initial timing using at least two indicators of the set of indicators that comprises: whether or not a measure of the carrier to noise ratio (CNR) is within a CNR range; that a threshold was exceeded by a measure of the rise in the received signal power to indicate an SOP time; that a range was reached by a measure of the autocorrelation of the input signal at the period of the symbols; that a threshold was exceeded by a measure of the correlation of the input signal with at least one of the short symbols; and that a threshold was exceeded by a measure of the correlation of the input signal with the start of the second part of the preamble, wherein the initial timing determining circuit determines the initial timing from at least one of: the time a measure of the received signal power exceeds a signal power threshold to indicate an SOP time; the time a measure of the autocorrelation of the input signal at the period of the symbols changes to indicate the time of end of the series of periodic symbols; the time a measure the correlation of the input signal with at least one of the short symbols peaks to indicate an SOP time; and the time a measure of the correlation of the input signal with the start of the second part of the preamble

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peaks to indicate the time of the start of the second part, and wherein the symbols have substantially constant envelope, and wherein autocorrelation circuit includes a phase shift key (PSK) detector to determine a coarsely quantized phase estimate, and a difference circuit to determine a monotonic function of the difference of the coarsely quantized phase estimate and a delayed version of the coarsely quantized phase estimate.

In regards to claim 36 the prior art does not teach determines the initial timing using at least two indicators of the set of indicators that comprises: whether or not a measure of the carrier to noise ratio (CNR) is within a CNR range; that a threshold was exceeded by a measure of the rise in the received signal power to indicate an SOP time; that a range was reached by a measure of the autocorrelation of the input signal at the period of the symbols; that a threshold was exceeded by a measure of the correlation of the input signal with at least one of the short symbols; and that a threshold was exceeded by a measure of the correlation of the input signal with the start of the second part of the preamble, wherein the initial timing determining circuit determines the initial timing from at least one of: the time a measure of the received signal power exceeds a signal power threshold to indicate an SOP time; the time a measure of the autocorrelation of the input signal at the period of the symbols changes to indicate the time of end of the series of periodic symbols; the time a measure the correlation of the input signal with at least one of the short symbols peaks to indicate an SOP time; and the time a measure of the correlation of the input signal with the start of the second part of the preamble peaks to indicate the time of the start of the

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second part, wherein the initial time determining circuit includes a detector to detect whether or not a measure of the CNR is in a CNR range wherein a first metric of the set of metrics is expected to be effective, and wherein initial time determining circuit uses the first metric for the initial timing determining only if it is detected that the measure of the CNR is in the CNR range.

In regards to claim 39 the prior art does not teach an initial time determining circuit coupled to the CNR detector, the autocorrelation detector, and to the correlator to determine an initial timing for a packet using that a threshold was exceeded by a measure of the correlation of the input signal with the start of the second part of the preamble, further using the time of a peak in the correlation of the input signal with the start of the second part of the preamble, and, if it is detected that the measure of the CNR is in the CNR range, further using that a range was reached by the autocorrelation measure.

In regards to claim 42 the prior art does not teach initial timing determining means uses at least two indicators of the set of indicators that comprises: whether or not a measure of the carrier to noise ratio (CNR) is within a CNR range; that a threshold was exceeded by a measure of the rise of the received signal power to indicate an SOP time; that a range was reached by a measure of the autocorrelation of the input signal at the period of the symbols; that a threshold was exceeded by a measure of the correlation of the input signal with at least one of the short symbols; and that a threshold was exceeded by a measure of the correlation of the input signal with the start of the second part of the preamble, wherein the initial timing

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determining means further uses at least one of: the time a measure of the rise of the received signal power peaks to indicate an SOP time; the time a measure of the autocorrelation of the input signal at the period of the symbols changes to indicate the time of end of the series of periodic symbols; the time a measure the correlation of the input signal with at least one of the short symbols peaks to indicate an SOP time; and the time a measure of the correlation of the input signal with the start of the second part of the preamble peaks to indicate the time of the start of the second part, to provide a measure of the initial timing, and wherein the symbols have substantially constant envelope, and wherein the autocorrelation means includes means to phase shift key (PSK) detect for determining a PSK detected signal, and means for determining a monotonic function of the difference of the PSK detected signal and a delayed version of the PSK detected signal.

In regards to claim 53 the prior art does not teach detecting the SOP includes: for each wireless networking standard, determining a corresponding logical function of at least two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal; that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble; and that a threshold was exceeded by a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble, and determining the OR of the plurality of the corresponding logical indicators, and wherein the measure of the correlation quality is a comparison measure



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of the instantaneous correlation power with the average correlation power in the recent past.

In regards to claim 57 the prior art does not teach detecting the SOP includes using at least one of the set of SOP methods that comprises: detecting that a threshold was exceeded by the average received signal power; detecting that a threshold was exceeded by the average power rise of the received signal; detecting that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble. wherein detecting that a threshold was exceeded by the average power rise of the received signal includes computing the ratio of the received power during the presence of a packet and the received signal power before the packet arrived, and wherein each of the received powers before and after the packet is computed on a logarithmic scale, such that computing the ratio includes subtracting the received power during the presence of a packet and the received signal power before the packet arrived.

In regards to claim 58 the prior art does not teach detecting the SOP includes using a set of SOP methods that comprises: detecting that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble; wherein a packet according to the wireless networking standard includes a preamble that has a first part that includes a series of periodic symbols and a second part, further comprising: determining a measure of the correlation of the input signal with at least one of the short symbols to provide a measure of the correlation of the input signal with a known part of the preamble, and wherein the input signal is provided

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as a set of received signal samples in rectangular coordinates, and wherein determining the measure of the correlation of the input signal with at least one of the short symbols includes: filtering the received signal samples using a FIR filter whose coefficients are time-reversed, complex conjugated samples of at least one of the short symbols, quantized to rectangular coordinates of  $\frac{1}{2} + j\frac{1}{2}$ .

The prior art alone or in combination fails to jointly suggest or teach the claimed combination of features as taught by the instant application. Therefore claims 3-5, 8-27, 33-39, 42-43, 53-55 and 57-59 are to be deemed allowable over prior art.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SALMAN AHMED whose telephone number is (571)272-8307. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on (571) 272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/S. A./

Examiner, Art Unit 2419

/Edan Orgad/

Supervisory Patent Examiner, Art Unit 2419